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A Trinidad Calypso Dancer Performs—French settlers in Trinidad inspired calypso singing of native Negroes. The ballading spread to other West Indies islands and became commercial entertainment for tourists (Bulletin No. 5).

CHARLES ALLMON

Through Pakistan's short history since 1947, Afghanistan has pushed its contention that the land of the Pathan tribesmen, in which the Khyber Pass lies, should be a free state rather than part of Pakistan's North-West Frontier Province. The Afghans recently requested British cooperation in arranging revision of a boundary treaty which they made with the British in 1921.

In Kipling's day the pass was a funnel for commerce, as told in the poet's "Ballad of the King's Jest":

> And there fled on the wings of the gathering dusk
> A savour of camels and carpets and musk,
> A murmur of voices, a reek of smoke,
> To tell us the trade of the Khyber woke.

The 30-mile gorge still is a vital link in the trade of southern Asia. Bright-colored trucks carry pomegranates and cotton from the north and buses transport passengers, inside or on their roofs, from Kabul, Afghanistan's capital, to Peshawar, near the southeastern mouth of the pass in Pakistan. Between sheer cliffs double-humped Bactrian camels still crest the pass, 3,733 feet above sea level, with bulky burdens. Vehicles use one road, pack animals another.

Pillbox-Studded—The barren, toilsome way is guarded by modern "pillboxes" erected by the British during World War II. On the Pakistan side a railway winds to the border.

Few mountain gaps possess so many historic associations as this gateway to the plains of India through the Safed Koh Range.

Although Alexander led the main body of his Greek forces into India farther to the north along the Kabul River, he probably sent a division through the Khyber. There, in 1672, Afghan tribes captured a neighboring army of 40,000 men, including its elephants and treasures.

The British fought a series of 19th-century wars along the border. The campaigns were marked by heroic deeds, hazardous sieges, and weary marches, many of them centering about the Fort of Ali Masjid, high on the pass. Today bronze plaques commemorate places where British and Indian regiments fought.

The cropless, waterless Khyber still has its warlike tribesmen, but since World War II they have mainly feuded among themselves, leaving the Khyber open as a door of commerce between nations. There are reasons for this: the British paid them to keep the peace, and Pakistan spends liberally on public works in the tribal areas to forestall uprisings.

References—Khyber Pass may be located on the National Geographic Society's map of India and Burma. Write the Society's headquarters, Washington 6, D. C., for a price list of maps.

See also, "American Family in Afghanistan," in *The National Geographic Magazine*, September, 1953; "Pakistan, New Nation in an Old Land," November, 1952; "We Took the Highroad in Afghanistan," November, 1950; "Back to Afghanistan," October, 1946; "South of Khyber Pass," April, 1946; and, in the GEOGRAPHIC SCHOOL BULLETINS, March 30, 1953, "Pakistan Sets the Experts Wondering." *(Issues of The Magazine 12 months old or less are available to schools and libraries at a specially discounted price of 50¢ a copy. Earlier issues sell for 65¢ a copy through 1946; $1.00, 1930-1945; $2.00, 1912-1929. Write for prices of issues prior to 1912.)*

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UMI

MAYNARD OWEN WILLIAMS

Camel Caravan Threads the Khyber—Pack animals take this road, wheeled vehicles another in moving through much-traveled Khyber Pass. The 30-mile gorge, a gateway to India, has been a route of trade and invasion for at least 35 centuries. It lies in northwest Pakistan at the Afghanistan border.

Bulletin No. 1, March 8, 1954

History Still Marches Through Khyber Pass

Khyber Pass, central Asia's historic invasion route to India, is known to almost every adventure-hungry American boy. It continues to be a crossroads of world events.

For centuries migrating tribesmen and marching or mounted troops have threaded the narrow defile. The Persian hordes of Darius, Greek soldiers of Alexander the Great, the Tatars of Tamerlane, bejeweled Mogul potentates and their enemies, the Afridi Pathans—all crossed the pass.

Hard-fighting British and their tribesmen allies won fame as the Khyber Rifles for guarding its camel caravan traffic. Their fame lives on in the motion picture, *King of the Khyber Rifles.*

Kipling Country—"That narrow sword-cut in the hills," Rudyard Kipling called the romantic pass. It lies within what is now Pakistan's North-West Frontier Province directly east of the border with Afghanistan. The Province was part of British India until 1947 when the separate independent states of Moslem Pakistan and Hindu India were set up within the British Commonwealth.

swampy, forested basin. Its sources are in mountains comparable in height to New York's Catskills and Adirondacks.

Lumbering is the chief industry. From October to May drenching rains fall. Bananas, palm oil, and manioc root provide food for the natives in their primitive forest villages. The region achieved renown a generation ago as the land of *Trader Horn*.

Once terrorized by raids of the slave trade and of cannibal tribes, the Gabon natives of the 20th century are sorely afflicted by leprosy, sleeping sickness, and other tropical diseases. In addition they suffer heart disease, injuries, and other ills that beset civilized folk.

Superstitions Plague Them—Even those the missionaries have taught often retain the old jungle fears. Women regard twins as a calamity and refuse to nurse an orphan, fearing the fate of the child's mother. Consequently, the mission at Lambaréné cares for many foundlings.

To this dark jungle region Albert Schweitzer came with his wife in 1914 at half his present age. He had resolved to live a new life of service to his fellow men—a career he had planned ten years.

As a boy in Alsace, he had been a musical prodigy, playing the piano and organ. By 1905, at the age of 30, he had earned doctorates in four fields and was internationally known in music and theology.

But to him his life was too self-centered. At 31 he embarked on a seven-year medical course, after which he raised what money he could and set out on his new career. Paddling up the Ogooué River, he took over an old mission station which had been raided and abandoned. Laboriously he built up his medical station which now numbers more than 50 crude but serviceable buildings.

Reverence for All Life—Today his mission consists of a clinic and hospital treating thousands of natives each year, and a separate colony of 300 lepers. His devoted and hard-worked staff includes a young American doctor, a displaced Hungarian doctor, an international staff of nurses including a few capable natives he has trained. Lepers that he has cured or almost cured perform much of the mission's manual labor.

To Lambaréné in June, 1952, came Volkmar Wentzel, National Geographic staff writer-photographer, and Mrs. Carnes Weeks, explorer. Their visit followed their participation in a two-month expedition studying bird and animal life several hundred miles northeast in Ubangi-Shari.

They described the Schweitzer mission as a beehive of activity—a community where every one works who possibly can. They found the hospital village pervaded by the profound spirit of reverence for life in all forms that is part and parcel of Albert Schweitzer:

> "The farmer who has mown down a thousand flowers in his meadow to feed his cows must be careful on his way home not to strike off in thoughtless pastime the head of a single flower by the roadside, for he thereby commits a wrong against life without being under the pressure of necessity."

References—Gabon may be located on the Society's map of Africa.

See also, in *The National Geographic Magazine*, August, 1953, "Safari Through Changing Africa"; "Hunting Musical Game in West Africa," August, 1951; "French West Africa in Wartime," March, 1942; "Timbuktu and Beyond," May, 1941; "Three-Wheeling Through Africa," January, 1934; and, in the GEOGRAPHIC SCHOOL BULLETINS, February 22, 1954, "Air Age Closes in on Timbuktu."

UMI

VOLKMAR WENTZEL

The "Prisoner of Lambaréné"—Albert Schweitzer lives simply in thought and action. After long hours daily at his medical duties he finds energy at night to correspond with friends in Europe and America who help support his jungle hospital, and to write scholarly books on philosophy, religion, and music.

Bulletin No. 2, March 8, 1954

Schweitzer's Africa Highlighted by Award

Award of the Nobel peace prize to philosopher-physician Albert Schweitzer has focused new interest on one of the earth's most remarkable men and on one of its least developed areas.

The Alsatian-born missionary's tireless work in his jungle hospital at Lambaréné in Gabon, French Equatorial Africa, has earned him world fame. The approach of his 79th birthday last January found the "Prisoner of Lambaréné" too busy with his humanitarian work to attend presentation ceremonies in Norway. His $33,000 Nobel prize money will add urgently needed buildings and equipment to his busy hospital and leper colony.

Ill-favored Land—Bisected by the Equator, Oregon-size Gabon is a land of panthers, gorillas, crocodiles, death-dealing tsetse flies, and malarial mosquitoes. In its steaming jungles 400,000 black-skinned natives know want and disease. It borders the Gulf of Guinea.

Lambaréné lies 125 miles up the Ogooué (Ogowe) River from Port Gentil. A large river, the Ogooué with its tributaries drains Gabon's

French explorer La Salle, first came upon the Falls on December 6, 1678.

If the erosion were to continue unchecked, the American Falls would be a bone-dry cliff in 2,000 years. In another 20,000 years, nothing would remain of the impressive water leap but a 35-mile stretch of rapids from Buffalo, at Lake Erie, to Fort Niagara, at Lake Ontario.

Slowed Down at Night—With more water diverted to hydroelectric use, the Falls will be slowed down at night and in the off-season to as little as 50,000 cubic feet per second, only a fourth of the Niagara River's normal flow. During spring and summer months, the daytime flow will be maintained at not less than 100,000 cubic feet per second for the benefit of the millions of visitors.

The Niagara is remarkable for its constant volume. It collects the entire natural discharge of four of the five Great Lakes. Only Ontario receives from rather than gives to the mighty river. The watershed covers an area nearly as large as the State of Texas.

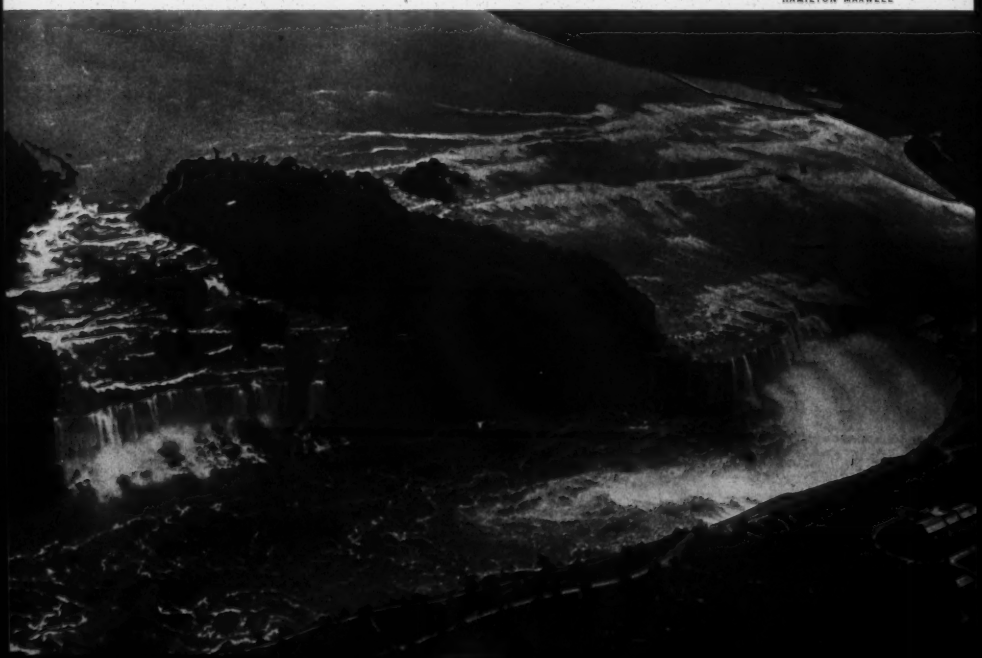
Niagara is not the world's biggest waterfall. Both Africa's Victoria Falls and South America's Iguassu (Iguazú) are wider and higher, with a greater water volume pouring over their crests in rainy seasons. Niagara's year-round volume is much greater, however. South America's Guaíra Falls (Salto des Sete Quedas) and the Khon Cataracts of Indochina carry larger volumes than Niagara, by year-round measurement, but neither is as high.

References—Niagara Falls may be located on the Society's map of the Great Lakes region.

See also "Ontario, Pivot of Canada's Power," in *The National Geographic Magazine*, December, 1953; "The World's Great Waterfalls," July, 1926 (out of print; refer to your library); and, in the GEOGRAPHIC SCHOOL BULLETINS, April 24, 1950, "Dual Personality Planned for Niagara Falls."

The Indians Had a Word for It—The roar of the river as it crashes over the limestone cliff gives Niagara its name—the Indians' word for "thunder of waters."

HAMILTON MAXWELL



Niagara Gets Beauty Treatment

Niagara Falls, North America's Number One cataract, is undergoing a course of beauty treatments calculated "to preserve and enhance" its spectacular charm.

A vast engineering project has been undertaken by the United States and Canadian governments to aid the world-renowned landmark in its fight against the forces that threaten its survival. From platforms specially built for "sidewalk superintendents," visitors may have the thrill of watching the hazardous job at close range.

The engineering work will divert more water from the Falls for power use in tourist off-seasons. It will install a control structure in the river a mile above the Horseshoe Falls to distribute the flow and thus lessen the rate at which the crest of the spectacle crumbles away.

Power vs. Scenery—Mecca of tourists and honeymooners, source of tremendous hydroelectric power, the cataract is jointly controlled by Canada and the United States. The various agreements between the two governments regarding their dazzling border attraction are admirable examples of international cooperation. It is estimated that the undertaking will cost some $17,500,000. Each government will pay half.

One of the world's most voluminous waterfalls, Niagara marks a popular point on the peaceful international border. Every year it attracts between three and four million visitors.

Niagara Falls, New York, in addition to its teeming life as a resort city, is a busy center of electrochemical industries. Plants for miles along the river use the Falls power to produce arc welders, carbon products, abrasives, machinery, cereals, and other commodities.

On the Canadian side of the river, at the city of Niagara Falls, Ontario, the mightiest of all Niagara hydroelectric plants, a $300,000,000 project, is under construction. Factory products include carborundum, graphite, silverplate, wire, batteries, and machinery.

Board Limits Water Used—Since 1910 the two countries have limited the amount of water used by the power plants. The Niagara Control Board, established in 1923, directs diversion to one side or the other, and takes care that the Falls are not robbed of their natural splendor.

The lip over which the river plunges is a hard limestone ledge twelve feet thick. Beneath it are layers of shale, sandstone, and more limestone. The churning waters wear away the soft strata, leaving a hard limestone overhang from which huge pieces break at intervals.

In the past century the crests of Niagara's twin cataracts have crumbled back 300 feet. The retreat continues at the rate of about three feet a year at the 160-foot-high Horseshoe Falls, over which some 94 per cent of the water passes, and four to seven inches at the American Falls, which is seven feet higher and takes only six per cent of the flow.

In 1931 about 80,000 tons of rock fell from the crestline of the American Falls, giving it an in-curve. There have been half a dozen breaks on the Canadian side in the past century. Some 900 feet of the Horseshoe Falls have worn away since Father Hennepin, missionary with

The sun particles spout forth and speed millions of miles through space as if forced at high pressure from a giant hose. When such a sun stream happens to approach the earth it encounters the earth's invisible field of magnetic force. The field is similar to that around any ordinary magnet. It extends thousands of miles out around the earth.

The Earth as a Magnet—The earth's magnetic field diverts sun particles toward the polar regions. From out in space an aurora would appear like two luminous clouds, one near each pole on the dark side of the earth. They might be hundreds or thousands of miles in length and breadth and extend 600 miles into the thinning atmosphere.

The same showers of sun particles that produce auroras also cause the weird "magnetic storms" that occasionally play hob with radio and telephone communications. They disturb the ionosphere, 50 to 250 miles above the earth. The ionosphere normally reflects radio signals, enabling them to travel far.

Analyzing the auroras' light with a spectroscope reveals what gases are present in the ionosphere and the sun streams' effect on them.

Oxygen atoms produce the bright red and yellow-green colors of the aurora. Nitrogen causes the orange-red, blue-green, blue-violet, and deep violet-gray shades. To the naked eye, auroras usually appear to be greenish white. Green is the aurora's predominant color, and the eye is much more sensitive to green than to red.

A bright aurora lights up the landscape at night about half as much as does the full moon.

Northern and Southern Lights—Residents of the Northern Hemisphere see only the aurora borealis. There is also the aurora australis, or "southern lights," seen far less frequently than its northern counterpart because there is little inhabited land within the region where it is visible. Contrary to common belief, the aurora is not most brilliant or frequent at the north and south geographic poles.

The northern region of greatest brilliance and frequency is in the latitudes of northern Norway; central Hudson Bay; Point Barrow, Alaska; and northern Siberia. As many as 243 auroras have been observed in a single year over central Hudson Bay.

Residents of northern Maine, Minnesota, North Dakota, and Montana see some twenty-five aurora displays annually—more than are witnessed farther south in the United States. Auroras are most frequently observed during the months of the spring and autumn equinoxes, around March 21 and September 21.

Over New York City, Chicago, and Portland, Oregon, the lights are visible about 15 times a year. Floridians, Texans, and residents of southern California rarely see the "northern lights" more than once each year.

A continuing research on auroras has been carried on since 1938 in the northern United States and southern Canada under the direction of Dr. Carl W. Gartlein, Cornell University physicist. It has had National Geographic Society support.

References—For additional information, see "Unlocking Secrets of the Northern Lights," in *The National Geographic Magazine*, November, 1947.

See also, in the GEOGRAPHIC SCHOOL BULLETINS, April 19, 1948, "Northern Lights Yield Secrets to Research."

UMI

TOP, C. L. HENSHAW, COLGATE. BOTTOM, C. W. GARTLEIN, CORNELL

3-D Vision Measures Aurora's Height—Pictures taken at the same instant 53 miles apart enable scientists to calculate height of display. Seen from Ithaca, New York (top), the aurora is farther to the right with respect to stars of the Big Dipper in background than in photograph taken at Hamilton, New York (bottom).

Bulletin No. 4, March 8, 1954

Electric Sun Streams Cause Auroras

What is an aurora? The question had no scientific answer until modern times. But today's firm knowledge of the cause and nature of auroras is helping science to understand the earth's mysterious shroud of atmosphere.

Since Bible times, perhaps even before, the shimmering night show of the aurora borealis or "northern lights" has been regarded with awe.

Calamity howlers have explained the spectacular displays as portents of war or even of the end of the world. Many a modern parent has explained them as sunlight reflected from Arctic ice fields, overlooking the fact that they often occur during the Arctic's sunless winter.

Today's truths about auroras are stranger than yesterday's fictions. The rippling arcs and streamers of light that compose an aurora are caused when electrified particles from the distant sun collide with atoms of the earth's rarefied upper air, exciting the atoms so that they glow.

lines experimented with warm-sea voyages to keep their big ships from idling away the cold months in port. Transocean travel normally slows down during the winter. However, ocean giants such as the *Queen Mary* and the *United States* are not diverted from their usual courses to winter cruises as they are too large for many small island harbors.

Ships Served as Troop Transports—After World War II it was some time before warm-sea cruisers resumed their trips. Many ships had been sunk or damaged. Others, long used as military transports, required months or years for reconversion to passenger use.

But this year's cruise schedule lists the largest number of ships since prewar days. Most of them sail from New York, although New Orleans is an increasingly busy point of departure. Even the Nation's Capital is becoming a cruise port. A ship sailing from Washington for Bermuda in late May is the first to make such a cruise run. On the west coast, cruises to Hawaii and other Pacific paradises originate at San Francisco and Los Angeles.

Prices of these ocean holidays vary from a six-day "budget" trip to Bermuda for as little as $95 to a de luxe 99-day voyage to Japan and the Pacific starting at $2,750. Among the most popular are a 15-day cruise to seven Caribbean ports, and a trip to the Mexican Gulf coast town of Vera Cruz with side trips to Mexico City, Taxco, and Cuernavaca.

A freighter carrying twelve passengers is a good substitute for a private yacht. On a 13-day tour to Central America, stops may be made at Cuban and Jamaican ports, depending on cargo. Such informal vessels take vacationers to small ports not visited by larger ships.

Island Way Stations Between Continents—A 34-day circle tour of the Atlantic includes stops at Bermuda, the Azores, Madeira, Lisbon, Cadiz, Casablanca, Senegal, the Canary Islands, the Cape Verde Islands, La Guaira on the Venezuelan coast, and Haiti.

A new luxury liner calls at Havana, the San Blas Islands, Panama, Salvador (Bahia), Rio de Janeiro, and Santos southbound for the Strait of Magellan on a 55-day cruise around South America. On the northbound leg it visits Valparaiso, the Juan Fernandez Islands, and Peruvian ports.

A tour of the Mediterranean includes visits, on the way, to Madeira, Gibraltar, and Casablanca. Stops are made at Alexandria, Beirut, Haifa, the Greek islands, Naples, Genoa, Cannes, Barcelona, and the Balearic Islands. The journey touches 20 ports in 65 days.

A 99-day voyage from New York to the Pacific, via the Panama Canal, gives its passengers glimpses of Peru, Easter Island, remote Pitcairn of *Bounty* fame, ports of Australia and New Zealand, Bali, Yokohama, and such other "South Sea" islands as Guadalcanal and the Fijis. Honolulu, and Acapulco on the west coast of Mexico are visited on the return.

References—Island cruise destinations may be located on the Society's newest map—the West Indies. Also see the maps of the Atlantic Ocean, Pacific Ocean, and The World Map.

See also, "Jamaica—Hub of the Caribbean." in *The National Geographic Magazine* for March, 1954; "Bermuda, Cradled in Warm Seas," February, 1954; "Crete, Cradle of Western Civilization," November, 1953; "On the Winds of the Dodecanese," March, 1953; "Happy-Go-Lucky Trinidad and Tobago," January, 1953; "Grass-skirted Yap," December, 1952; and numerous other articles listed under "Cruises and Voyages" in the *Cumulative Index to the National Geographic Magazine.*

UMI

JEAN AND FRANC SHOR

White Sails in the Sunlight Wave Welcome to Rhodes—Done out of their original jobs by electricity, old stone windmills have taken up new careers. Still whirling triangular wings in the breeze, they add to the charm of this largest of Greece's Dodecanese Islands, enthralling Mediterranean voyagers who visit the ancient port.

Bulletin No. 5, March 8, 1954

Southbound Cruise Ships Ignore the Calendar

Cruising south to balmy seas has become a year-round diversion. Although the tide of sun-seekers reaches flood stage in early March, there is no letup in sight. Ocean breezes and waving palms, coral beaches and curling combers have spring and summer lure as well.

This winter an estimated 65,000 escapists have boarded ships for exotic shores, mostly tropical. More than 150 cruises sail from New York and other United States ports bound for the Caribbean (illustration, cover), Mediterranean, Pacific, and South American waters.

Winter cruises began in earnest some 25 years ago when steamship

J. BAYLOR ROBERTS

President Eisenhower Presents National Geographic Society's Hubbard Gold Medal to Expedition That Conquered Mount Everest

At the White House, February 11, the Chief Executive hands the award to Sir John Hunt, leader of the team that "excited the admiration of the entire world" by its achievement, May 29, 1953. Sir Edmund Hillary, New Zealander (right), reached the world's highest summit with guide Tensing Norkey. At left are Sir Roger Makins, British Ambassador, and Dr. Gilbert Grosvenor, President, National Geographic Society.